

represented in a coloured plate. Of the Mollusca, the Gymnobranchs are described by Dr. H. A. Meyer. The number of species met with is but twenty-three; there is not much that is noteworthy in the list, but that "singular and gaudy animal" of Montagu, *Thecacera pennigera*, so rare on the British coasts, was met with. The list of the Brachiopods, Lamellibranchs, and Gasteropods is a very elaborate one, drawn up quite after the fashion of our British Association Dredging Reports; the locality, depth in fathoms, and nature of the ground in which each species was found is given, and a sketch of its geographical distribution is added. The greatest depth reached was about 365 fathoms. *Crania anomala* and *Terebratulina caput-serpentis* appear to have been met with in quite shallow water; *Malletia* (*Yoldia*) *obtusa*, Sars., *Kelliella abyssicola*, Sars., and other deep-sea species were met with at depths of from 50 to 360 fathoms. The following species are described as new:—*Lacuna vestita*, off Yarmouth; *Laëocochlis pommeraniae*, nov. gen. et sp.; *Fusus mæbii*, and *Lathyrus albellus*. These three latter species are figured.

Article IX., by Dr. Möbius, describes the Copepoda and Cladocera. *Euchaeta carinata*, sp. n., is described and figured. The remaining orders of Crustacea are described by Metzger. We note the appearance in the North Sea of an *Erichthus* form, thus indicating the presence of a Squilla. *Galathea Andreusii*, Kin., is placed as a synonym of *G. intermedia*, Lillj. b.; *Thia polita*, *Nika edulis*, *Bythocaris simplicirostris*, and other interesting forms, were met with. *Sergestes Meyeri*, *Byblis crassicornis*, and *Dulichia monocantha* are described and figured as new.

The list of fish taken is most meagre, containing but thirty-two species.

The meteorological investigations of Prof. Karsten are exceedingly interesting, and records are appended as to the temperatures of the sea at various depths.

Dr. Hensen appends a Report on the Fisheries of the German Coast, in which we find elaborate statistics of the number of fishing-stations, of the fishermen, and the amount of assistance given to them. The off-shore fishermen are distinguished from the deep-sea trawlers. The number of fishermen on the German coasts is 17,195, with say 8,130 boats; the number of English fishermen, is given as 134,000, with 36,000 boats. In France, the number is 73,757 men, with 16,819 boats; in Italy, 60,000 men and 18,000 boats; in Austria, 7,196 men and 1,852 boats. These numbers are based on reports dating between 1871 and 1874.

A portion of the Report is devoted to the subject of the possibility of estimating the take of fish. According to the official return of the German Treasury on the import and export of fish during 1873, it would appear that these equalled on—

River fish and cray-fish	...	...	342,000
Sea fish in general	...	...	3,156,000
Herrings	...	...	27,798,000
Shell fish	...	...	387,000
Caviar	...	...	973,000
Total	...	...	32,650,000

This portion of the Report of the North Sea Commission ought to be studied by all those interested in our own fisheries.

E. P. W.

OUR BOOK SHELF

Eighth Annual Report of the Noxious, Beneficial, and other Insects of the State of Missouri. By Charles V. Riley, State Entomologist.

THE perusal of Mr. Riley's yearly reports is one of the pleasures to which the entomologist looks forward with undiminishing eagerness. Each succeeding volume throws open to the student of science fresh fields of discovery in the realms of both nature and art. Mr. Riley's ready appreciation of the practically useful in invention, accompanied by that quick discernment which enables him at once to reject or rectify what is useless or cumbersome, renders him especially fitted for the responsible position which he occupies.

The report now before us is devoted to the consideration of five noxious insects, and one innoxious—the Colorado Beetle, the Canker-worm, the Army-worm, the Rocky Mountain Locust, the Grape Phylloxera, and the Yucca-borer, the greater space being given to the third and fourth of the above-mentioned species, in consequence of the ravages which they have committed in Missouri during the past year.

In the chapter on the Canker-worm an illustrated description is given of a very simple and ingenious contrivance (p. 20) for arresting the progress of the insect at the time of oviposition; it consists of a circle of tin which surrounds the trunk of the imperilled tree at a few inches distance, and which is held in position by a circle of muslin attached to the tin at its lower edge, and drawn closely round the trunk, with a cord, at the top; the tin is then covered with a mixture of castor oil and kerosene on its inner surface, which forms an effectual barrier to the insects.

Other interesting inventions are described; and not only are careful figures prepared of the noxious species in all stages, but also of their natural enemies; so that it is the agriculturist's own fault if he fails to distinguish between his friends and foes.

The Report concludes with the life-history of the Yucca-borer (*Megathymus yuccæ*), an insect hitherto referred to the moths, but which Mr. Riley determines to be a butterfly. Judging by the figure of the adult larva it might be questioned whether the insect is not as nearly related to the moths; it has the aspect of a *Sphinx* larva with the wrinkled and (apparently) shining character and general coloration of a *Cossus*; the pupa bears out the resemblance; the rapidity of its flight quite accords with what is notoriously the character of a Hawk-moth, and the form of its antennæ in no way militates against such an affinity; still it must in fairness be admitted that Mr. Riley adduces much evidence in favour of the Rhopaloceros character of the species, the value of which cannot be contradicted until we can bring forward proofs that some undoubted moth possesses the same structural peculiarities.

A. G. B.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

Optical Experiments

1. Fold a sheet of writing-paper into a tube whose diameter is about 3 cm. Keeping both eyes open, look through¹ the tube with one eye, and look at the hand with the other, the hand being placed close by the tube. An extraordinary phenomenon will be observed. A hole the size of the tube will appear cut through the hand, through which objects are distinctly visible. That part of the tube between the eye and hand will appear

¹ Mr. Riley notes its resemblance to this genus (p. 177).

² It is necessary to focus the eye upon any object seen through the tube.—Ed.

transparent, as though the hand were seen through it. This experiment is not new, but I have never seen it described. The explanation of it is quite evident.

2. Drop a blot of ink upon the palm of the hand, at the point where the hole appears to be, and again observe as before. Unless the attention be strongly concentrated upon objects seen through the tube, the ink-spot will be visible within the tube (apparently), but that part of the hand upon which it rests will be invisible, unless special attention be directed to the hand. Ordinarily the spot will appear opaque. By directing the tube upon brilliantly illuminated objects, it will, however, appear transparent, and may be made to disappear by proper effort. By concentrating the attention upon the hand, it may also be seen within the tube (especially if strongly illuminated), that part immediately surrounding the ink-spot appearing first.

3. Substitute for the hand a sheet of unruled paper, and for the ink-spot a small hole cut through the paper. The small hole will appear within the tube, distinguishing itself by its higher illumination, the paper immediately surrounding it being invisible. Many other curious experiments will suggest themselves. For example: if an ink-spot somewhat larger than the tube be observed, the lower end of the tube will appear to be blackened on the inside.

4. While making these experiments, an improvement upon the experiment described in NATURE, vol. xii., p. 502, was suggested, as follows:—Look through a paper tube with one eye at green paper, and through another tube with the other eye, at red paper. The paper should be illuminated by the direct solar ray. The two colours, at first vivid, are rapidly enfeebled. After half a minute, transfer both eyes to either one of the papers, say red. To the eye fatigued by green, the red colour is very brilliant, and the effect is the more striking on account of the simultaneous impressions now received by the two eyes.

Washington University, St. Louis

F. E. NIPHER

Antedated Books

THE evil practice of issuing antedated periodicals has long been a matter of complaint amongst naturalists. The editor of the *Journal für Ornithologie* is a well-known sinner in this respect—the quarterly number of that journal, although invariably dated on the first day of each quarter, being always several months in arrear. But a still more flagrant instance of this practice is now before me in the third number of the new edition of Layard's "Birds of South Africa," which, although only issued to the subscribers within these last few days, is dated on the cover "May, 1875!" As two new genera (*Aethochila* and *Neocichla*) are instituted herein, the result is to give these names an unjust priority of fifteen months over what they are legally entitled to. This seems to be a still easier method of gaining precedence than the American practice of publishing telegraphic bulletins of new discoveries, and will not, I trust, be persevered in, if attention is called to it.

F.Z.S.

August 7

Protective Mimicry

I HAVE been reading over in the file of NATURE the controversy that arose out of Mr. Alfred Bennett's paper at the British Association in 1870, on "Natural Selection from a Mathematical Point of View," in which he attacked Darwin's theory on what seems to be one of its strongest points, namely, protective mimicry. I do not feel certain whether he is right or not in denying that natural selection is adequate to produce mimicry. The argument really depends on a question of fact, namely, whether the first variation could be great enough to be useful to its possessor; and from the great comparative variability of colour, I see no decided impossibility in this.

But the writers in that controversy neglected other facts of colour which it seems impossible for natural selection to produce, from the infinite improbability of a first variation ever occurring. One of these is the change of colour with the seasons in such animals as the ermine, which is brown in summer and white in winter. Had the ermine been either permanently brown or permanently white, there would have been nothing wonderful in it, but it seems impossible that the character of becoming white in the winter and brown in the summer could ever have originated in ordinary spontaneous variation, without a guiding intelligence.

Another case of at least equal difficulty is the case of change of colour for the purpose of protection, from moment to moment. The chameleon is the best known instance of this, but I believe there are many such cases among fishes. It seems utterly impossible for such a character to originate in spontaneous unguided variation.

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim, July 20

A REMARKABLE instance of this phenomenon is shown in a small crustacean, of the genus "Rypton" (Mr. Spence Rate has not yet determined whether it be a new species or no). This very delicate little animal is found only in holes in the coral inhabited by the common "Echinus" of Mauritius; its colour is a deep purple, with four longitudinal stripes of a much lighter tint; and this is precisely the pattern of the spines of the said Echinus.

WILMOT H. T. POWER

λ Ophiuchi

I AM going to undertake the calculation of elements of λ Ophiuchi, which you proposed to calculators in NATURE, vol. xiv. p. 29. I shall also within a short time give orbits of γ Coronæ, which has not been separated as far as I know since spring, 1867, when it was observed in Harvard College, and of ξ Libræ (Scorpii). About the latter binary star we know but very little. Mädler has given a circular orbit with a period of over 100 years, while Thiele gives a highly eccentric orbit with a period of about fifty years. It may very likely be found that the older determination is the most trustworthy, but the case deserves a thorough examination, which I am going to make. I have been engaged in a re-determination of elements of 6 Coronæ, by which the long period has been re-ascertained.

There are different other double stars which with advantage might be inquired into, and thus prevent different investigators from confining themselves to the same objects, while others remain uncared for. I hope that you will be kind enough to publish the above remarks in your widely circulated paper.

Markree Observatory, Collooney,
Ireland, July 17

WILLIAM DOBERCK

The Cuckoo

THE cuckoo is still singing in this part of the country. I may mention, as a point of some interest, that the note of this bird in South Germany is precisely the same in pitch as it is here, the observations in both cases having been made with a tuning-fork in the month of May.

Can any of your readers inform me whether the cuckoo in *all parts of the country* is in the habit of occasionally singing the *cuc* without the *boo*?

GEORGE J. ROMANES

Ross-shire, July 24

THE FERMENTATION OF URINE AND THE GERM THEORY

CAN Bacteria or their germs live in liquor potassæ (Pharm. Brit.) when it is raised to the boiling-point (212° F.)? Such is now the simple issue to which certain great controversies have been reduced. If Bacteria germs cannot resist such an exposure, then, by M. Pasteur's own implicit admission, his exclusive germ-theory of fermentation must be considered to be overthrown by the broader physico-chemical theory. The truth or not of M. Pasteur's germ-theory is the central question in dispute, but standing on either side, or in close juxtaposition, are two dependent subjects of controversy whose importance for biological science and for medicine is even greater.

The question whether living matter can or cannot originate *de novo*, for example, depends upon the answer which is to be given to the question whether Bacteria and their germs are or are not killed in boiling liquor potassæ. This, also, is practically admitted by M. Pasteur in his comments (*Comptes Rendus*, July 17) upon my recent experimental evidence.

The other subordinate problem, the solution of which